OLR RESEARCH REPORT

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RETROREFLECTIVITY STANDARDS FOR HIGHWAY SIGNS

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You asked how many states have adopted minimum standards for traffic sign retroreflectivity, and how much it costs to replace non-compliant signs. We also include information from the state Department of Transportation on its sign replacement program.

SUMMARY

We were unable to learn how many states have adopted these standards. But the American Association of State Highway and Transportation Officials (AASHTO) has offered to conduct a survey to find out how many states have adopted the minimum retroreflectivity standards. We will forward you the survey results when we receive them.

The total cost of sign replacement would depend, among other things, on the labor and material cost to replace each sign, the total number of noncompliant signs, the scope of the changes, the costs of inspecting and assessing the signs, and other variables.

In general, the studies we found indicate that the cost of replacing an individual sign would range between $100 and $200. However, an Indiana study estimated the cost in that state to be $64.58.

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A 2007 Federal Highway Administration (FHWA) study estimated that replacing "regulatory," "warning," and "guide" signs over seven years would cost state and local agencies $5 million and $11.5 million, respectively.

The DOT is actively replacing its expressway (interstate highways and state routes) with signs that should meet minimum retroreflectivity standards, replacing the oldest signs first. We describe the status of its sign replacement program below.

BACKGROUND

While many materials reflect light, a "retroreflective" material reflects light back towards the light source. For retroreflective signs, this means reflecting light back towards a car's headlights. According to this website, "a driver of a vehicle sees an image in a retroreflecting surface that includes the headlamps of the vehicle, and therefore is more bright than a surface with ordinary reflection."

Highway signs that are brighter and easier to see and read are important, according to the FHWA, because about half of traffic fatalities occur at night. "Adequately maintained retroreflective signs and pavement markings improve highway safety and prevent roadway departure crashes," the FHWA says. Further, the FHWA says, improving nighttime visibility of traffic signs will become "ever more important as the older driver population increases."

Minimum Retroreflectivity Standards

In 1992 Congress enacted PL 102-388, which, among other things, directed the U.S. Transportation Secretary to develop a minimum level of retroreflectivity for traffic signs and pavement markings for inclusion in the Manual of Uniform Traffic Control Devices (MUTCD). (The MUTCD is the national standard for traffic control devices used on all streets, highways, bikeways, and private roads open to public travel. Although the MUTCD had required illuminated highway signs since 1935, it had not set minimum standards for retroreflective signs.)

As a result, the FHWA proposed minimum retroreflectivity standards and set deadlines by which state and local highway departments had to comply. It required state and local highway agencies, by January 22, 2012, to have programs in place to maintain sign retroreflectivity at or above the minimum standards. Signs that did not meet these standards had to be replaced by 2015 or 2018, depending on the type of sign.

By 2015, highway agencies had to replace noncompliant "regulatory signs," (e.g., "stop," "yield," or speed limit signs); "warning signs," (e.g., traffic arrows or "merge" signs); and "guide" signs (e.g., route number, destination, and roadside services signs). They had to replace noncompliant street name signs by 2018.

But the FHWA agreed to push back or eliminate those deadlines in May 2012 after state and local highway departments said it would be too costly to replace noncompliant signs by the deadlines. The FHWA as a result has delayed for more than two years (from January 2012 to May 2014) the date by which state and local transportation agencies need a sign management program in place and eliminated the 2015 and 2018 sign replacement deadlines.

The FHWA also excluded guide signs from the 2014 management program deadline, limiting this deadline only to regulatory and warning signs. The FHWA said it did this because "the additional cost of including [them] would increase the economic burden on agencies, whose funds are limited due to the current economic climate." But, the FHWA declared, it "still requires agencies to establish a method for all types of signs…as resources allow."

Similarly, the FHWA said, elimination of the 2015 and 2018 deadlines for sign replacement does not eliminate the need for transportation agencies to meet the new retroreflectivity standards. "The standard itself remains in the MUTCD and applies to any new installations," states FHWA's May 14, 2012 final rule. "Even without a specific date agencies will still need to replace any sign they identify as not meeting the established minimum retroreflectivity levels. Their schedules replacing the signs, however, would be based on resources and relative priorities, rather than specific compliance dates."

HOW MANY STATES HAVE ADOPTED THE RETROREFLECTIVITY STANDARDS?

We were unable to answer this question in time for this report. However, we contacted the National Conference of State Legislatures (NCSL), which, in response to our request, has informed us that AASHTO has volunteered to survey some its members to try to learn this information. We will forward you this information when we receive it.

COSTS OF MEETING THE RETROREFLECTIVITY STANDARD

Several reports discussing potential costs note that these costs will vary depending on the type of material used in the signs, and that there are additional costs involved in identifying signs that fail to meet the minimum standards.

We found several references to the costs of meeting minimum retroreflectivity standards. The information below comes from the FHWA's Sign Retroreflectivity Guidebook, a 2012 report conducted for the National Cooperative Highway Research Program (NCHRP), a 2007 FHWA study, and an Indiana study.

Guidebook Formula

The cost formula in FHWA's Sign Retroreflectivity Guidebook is based on the number of signs a town, city, or regional agency has; the percentage of signs of different types (regulatory, warning, or guide); and the percentage of signs needing maintenance. For purposes of approximate cost, it uses a default value of $150 per sign, which includes both material and labor.

For example, the guidebook estimates that 80% of the traffic signs in an average city are regulatory signs, 15% are warning signs, and 5% are guide signs. Of these, it estimates that 10% of the regulatory signs, two-thirds of the warning and signs, and half the guide signs will need maintenance or replacement. A city would multiply the number of signs it has in each category that need replacing by $150 to estimate the costs sign replacement.

Other Cost Studies

The NCHRP report, Practices to Manage Traffic Sign Retroreflectivity, was written before FHWA eliminated the 2015 and 2018 deadlines. According to the report, "each agency will encounter different circumstances when addressing these two compliance dates. Some proactive agencies may have few signs to replace, while others may have to replace a large portion of their sign population."

The report cited a 2007 study, "Maintaining Traffic Sign Retroreflectivity: Impacts on State and Local Agencies," that "estimated that the two compliance mandates will cost the nation approximately $37.5 million…It is estimated that the 2015 compliance will cost state and local agencies $5 million and $11.5 million, respectively, and the

2018 compliance requirements will cost $6.8 million and $14.2 million, respectively." (The figure is higher for local agencies than state agencies because, according to the study, local agencies maintain most of the nation's public roads.)

The 2007 report estimated the total cost of an installed sign between $100 and $200. It considered such cost elements as design, fabrication, installation, and maintenance. It excluded labor, equipment, and mileage costs of replacing signs, assuming that non-compliant signs would be replaced during a normal maintenance cycle.

An Indiana study estimated that it would cost $14.2 million to bring all its roadway signs into compliance with the proposed minimum retroreflectivity standards. The study arrived at the statewide fiscal impact by adding the costs for its cities ($6.6 million), counties ($4.9 million) and towns ($2.7 million). It estimated an average replacement cost per sign in that state of $64.58, including the costs of labor, overhead, prepared sign sheeting, and sign posts.

CONNECTICUT SIGN REPLACEMENT PROGRAM

Charles Harlow, DOT's Manager of Traffic Engineering, says that while the department does not have a formal master plan, it is "actively replacing highway signs," with signs that should meet the minimum retroreflectivity standards, with the oldest signs being replaced first.

According to Harlow:

- I-95 signing has been replaced from New York to Branford within the last five years, "except for a couple of gaps which will be filled next year; "
- I-84 has been replaced or is currently being replaced from New York through Waterbury;
- Route 7 has been replaced for its entire length within the last couple of years;
- the Merritt and the Wilber Cross highways were replaced about 12 years ago [as were] the large signs on I-95 from Waterford through Guilford;

Harlow said he expects to replace all signs on I-395 from Waterford to the Massachusetts Border…in the next couple of years. “Beyond that,” he said, DOT will seek to replace “the signs [on] I-95 from Groton to New London…next. We are currently re-evaluating the signing for the rest of I-84, I-91, Route 2, I-384, and I-691 in order to prioritize the next projects.”

Harlow estimated the cost of installing the signs on I-395 to be roughly $7 million. “What with the structure repair/replacement work needed for our busier expressways," he said, "a ballpark estimate to upgrade the outstanding expressways is probably in the range of $200 million.”

He said that DOT plans to develop a replacement plan for secondary roads in the next couple of years “as the department finalizes our inventory of all signs on state roads. The inventory will help the department meet one of the requirements of the new mandate by helping us with our management system.”

MORE INFORMATION

In addition to the sources cited above, more information about retroreflective signs can be found at the FHWA retroreflectivity toolkit website: http://safety.fhwa.dot.gov/roadway_dept/night_visib/retrotoolkit/.

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